

## Atomic Beam Source for the Polarized Internal Gas Target of ANKE at COSY

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In order to carry out nucleon-nucleon interaction studies with polarized proton and deuteron beams and targets at COSY/Jülich, our group is currently developing a polarized internal storage cell gas target. The target will be implemented at the magnetic spectrometer ANKE [1]. Polarized atoms are provided by a new polarized atomic beam source for which a state-of-the-art system of sextupole magnets was developed [2]. Investigations of the atomic beam intensity have been carried out with a compression tube. A of  $(7.4 \pm 0.3) \times 10^{16}$  atoms/s could be achieved when two hyperfine states of hydrogen are injected into the compression tube. Beam properties were studied by means of a quadrupole mass spectrometer, mounted on an XY table. For the future experiments at COSY, in particular with polarized deuterium targets, a Lamb-shift polarimeter was developed and built at the University of Cologne [3] to obtain precise information about the degree of polarization. First measurements of the nuclear polarization of an atomic hydrogen beam, using only one rf-transition unit (MFT), yield a value of  $P = 0.889 \pm 0.009$ . Recently, a first test with the complete system of rf-transitions has been carried out with deuterium as well. In the near future a series of polarization measurements on atoms extracted from prototype storage cells will be carried out. Concurrent to these developments, in order to identify cells suitable for the experiments at COSY, first studies of the properties of the stored COSY beam have been carried out with an aperture at the ANKE target position.

## References

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- [2] A. Vassiliev et al., Rev. Sci. Instrum. 71, 3331 (2000).
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